

Head length 3.9 to 4.1 times in standard length. Eye diameter 4.3 to 4.6 times in head length. Lateral line complete with 28-29 scales. Predorsal scales 10-12.

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22. SOME OBSERVATIONS ON THE BIOLOGY OF
THE PARASITIC BEETLE *METOECUS PARADOXUS* LINN.
(RHIPIPHORIDAE: COLEOPTERA) ON MUD DAUBER WASP GRUBS

(With one plate)

The Rhipiphorid beetles *Metoecus paradoxus* Linn. are seen in grassland vegetation and are parasitoids on mud dauber wasp grubs of the family Eumenidae.

The mud dauber wasps such as *Eumenes conica* Fab., *E. edwardsii* Sauss. and *Rhychium nitidulum* Fabr. belonging to Eumenidae build small pot like cells to raise their progeny (Ayyar,

1910). The female first selects a place such as buildings, tree-twigs, or undisturbed human habitats for constructing a cell. The wasp then takes water in its mouth from a nearby water source, goes to the mud collecting place, usually a termitarium or dryland, regurgitates water on the soil surface and with the help of its mandibles and forelegs starts scraping the wet soil to make

a small globular, shiny mud pellet. The wasp then takes this pellet with its mandibles and forelegs to a previously selected place to build a small pot like cell with a small funnel like mouth. The female wasp inserts the abdomen tip into the mouth and deposits an egg inside the cell. Then the wasp goes foraging to provide paralyzed caterpillars as food for the hatching young wasp grub.

The Rhipiphorid beetles lay their eggs in the surrounding vegetation. The eggs on hatching into triungulin larvae want to catch hold of the leg of wasps coming in their way during foraging. The triungulin larva attaches itself to the wasp leg and reaches the mud cell. It passes into a period of waiting stage about 8 to 12 days inside the cell. During this period the wasp egg hatches and becomes a fleshy lemon yellow grub in about 8 to 10 days, forming a thin white membrane lining the cell wall as a whole. The minute triungulin Rhipiphorid larva at this stage loses its legs and penetrates the wasp grub, feeds as an endoparasitoid for 3 to 4 days. Then it is ectoparasitoid for about 20 days, holding the anterior part of the head of the wasp grub like a collar (Fig. A and Fig. B). Throughout the grub stage, the parasitoid beetle grub secretes a digestive enzyme which it ejects at the point of contact with the eumenid grub, keeping it from decay for about 18-20 days. Within this period the Rhipiphorid grub completes its feeding and starts pupating within the same cell (Fig. C). The pupal stages (Fig. D & E) lasts between 7 to 9 days and then slowly changes to the characteristic

fully grown red and black coloured adult in a period of 38 to 42 days (Fig. F).

One interesting fact as far as the mud cell is concerned is that the parasitoid Rhipiphorid beetle, after the completion of its complicated life cycle, cannot escape out of the cell because it cannot gnaw out of the hard mud cell due to the second layer of mud coated by the female wasp brought from the termitarium. The beetle escapes if the mud cell is broken accidentally, otherwise it gets trapped and dies inside the mud cell. In case of paper wasps, sand wasps and bees, the young Rhipiphorid beetles can emerge because their nests are open in nature hence they survive. This is the first record of a Rhipiphorid parasitoid beetle from the cells of the mud nests of Eumenid wasps in India.

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23. PREDATION BY ANTS ON FROGS AND INVERTEBRATES

On November 29, 1995, while we were walking along a perennial stream bed in Phansad Wildlife Sanctuary (Maharashtra), at around 10:30 in the morning, we noticed some army ants moving in columns along the ground. There was

forest on either side of the stream. The ants were about a centimetre in length and made a buzzing sound when we blew on the densely packed columns. Though we were unable to identify these ants, from the descriptions given by Lefroy